Module - 5 Network Fundamentals and Building Networks

Section 1 : Multiple Choice

1. What is the primary function of a router in a computer network ?

   Ans : c) Forwarding data packets between networks

2. What is the purpose of DHCP (Dynamic Host Configuration Protocol) in a computer network ?

   Ans : d) Dynamically assigning IP addresses to devices

3. Which network device operates at Layer 2 (Data Link Layer) of the OSI model and forwards data packets based on MAC addresses ?

   Ans : b) Switch

4. Which network topology connects all devices in a linear fashion, with each device connected to a central cable or backbone ?

   Ans : b) Bus

Section 2 : True or False

5. A VLAN (Virtual Local Area Network) allows network administrators to logically segment a single physical network into multiple virtual networks, each with its own broadcast domain.

Ans : True

6. TCP (Transmission Control Protocol) is a connectionless protocol that provides reliable, ordered, and error-checked delivery of data packets over a network.
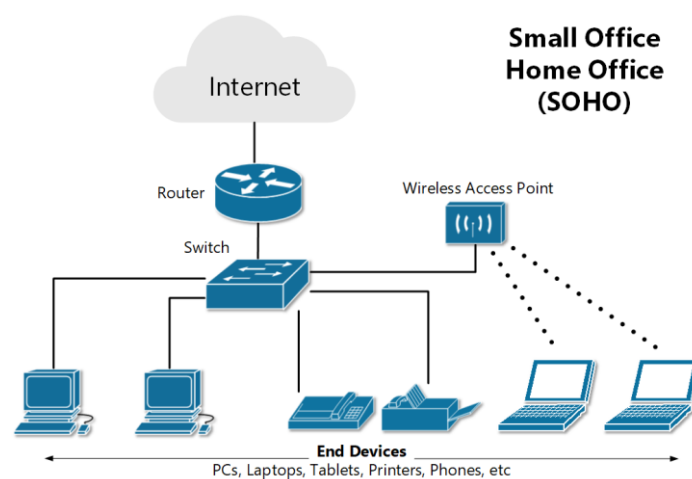
Ans : False

7. A firewall is a hardware or software-based security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules.

Ans : True

8. Describe the steps involved in setting up a wireless network for a small office or home office (SOHO) environment.

Ans :

1) Get Required Devices
   - **Internet connection** (from ISP)
   - Modem
   - Wireless Router
   - Devices like **laptops, mobiles, printers**

2) Connect Modem to Router
   - Connect the **modem** to the **router's WAN/Internet port** using an Ethernet cable.

3) Power On Devices
   - Turn on the **modem** first, then the **router**.
   - Wait for indicator lights to become stable.

4) Configure the Router
   - Open a browser and type the router IP (e.g., 192.168.1.1)
   - Login using default username/password
   - Set :
     - Wi-Fi name (SSID)
     - Strong Wi-Fi password
     - Enable WPA2/WPA3 security

5) Enable DHCP
   - Turn on **DHCP** so devices get IP addresses automatically.

6) Connect Devices
   - Search for the Wi-Fi name (SSID)
   - Enter the password
   - Connect laptops, mobiles, and printers

7) Test the Network
   - Open a website to check internet access
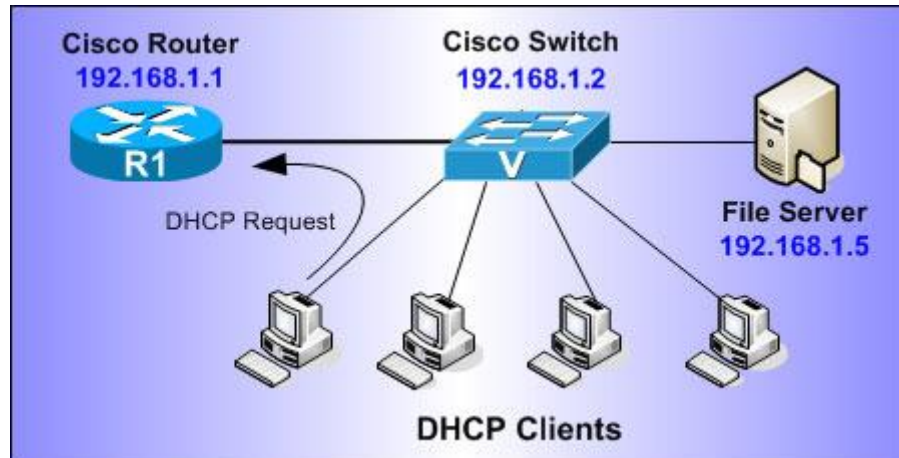   - Move around to ensure good Wi-Fi signal

8) Secure the Network
   - Change default router password
   - Disable WPS if not needed
   - Update **router** firmware

Section 4 : Practical

9. Demonstrate how to configure a router for Internet access using DHCP (Dynamic Host Configuration Protocol).

Ans :

1) Physical Connections
   - Connect ISP cable / modem to the router WAN (Internet) port
   - Connect a PC/Laptop to the router LAN port using Ethernet cable
   - Power ON all devices

2) Access Router Configuration Page
   - Open a web browser on PC
   - Type router IP address : 192.168.1.1
   - Login using admin credentials

3) Configure WAN (Internet) Using DHCP
   - Go to **Internet / WAN Settings**
   - Select : Connection Type: DHCP (Automatic IP)
   - Save settings

4) Enable DHCP for LAN
   - Go to **LAN Settings → DHCP Server**
   - Enable DHCP
   - Configure :
       - Start IP : 192.168.1.100
       - End IP : 192.168.1.200
       - Subnet Mask : 255.255.255.0
       - Default Gateway : 192.168.1.1
   - Save settings

5) Configure PC to Obtain IP Automatically
   - On PC :
       - Open Network Settings
       - Select Obtain IP address automatically
       - Select Obtain DNS automatically

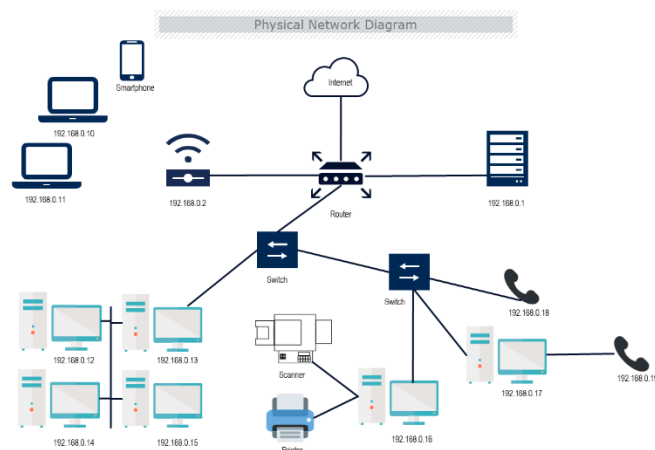6) Verify DHCP Configuration
   - Open Command Prompt on PC and type : ipconfig
   - You should see :
       - IP Address: 192.168.1.x
       - Default Gateway: 192.168.1.1

7) Test Internet Connectivity
   - Open browser → visit any website

10. Discuss the importance of network documentation in the context of building and managing networks.

Ans :

Physical Network Diagram

1) Easy Network Understanding
   - Helps administrators quickly understand the **network layout**
   - Shows devices, IP addresses, cables, and connections

2) Faster Troubleshooting
   - Makes it easy to **find problems** in the network
   - Saves time during **network failures**

3) Smooth Maintenance & Upgrades
   - Helps during **software updates** or **hardware replacement**
   - Reduces chances of **mistakes**

4) Improves Security
   - Helps track **firewalls, VLANs, and access controls**
   - Identifies **unauthorized devices**

5) Better Network Planning
   - Helps plan **future expansion**
   - Avoids IP conflicts and poor design

6) Knowledge Sharing
   - New staff can understand the network easily
   - Reduces dependency on a single person

➢ Examples of Network Documentation
   - Network topology diagrams
   - IP address list
   - Device configuration backups
   - VLAN and firewall rule details